



TENNESSEE DEPARTMENT OF

EDUCATION

FIRST TO THE TOP

Global Health and Epidemiology

Primary Career Cluster:	Health Science
Consultant:	Sheila Carlton, (615) 532-2839, Sheila.Carlton@tn.gov
Course Code:	TBD
Prerequisite(s):	<i>Behavioral and Community Health</i>
Credit:	1
Grade Level:	11-12
Graduation Requirement Substitution:	None
Programs of Study and Sequence:	This is the third course in the <i>Public Health</i> program of study. <i>Health Science Education</i> may be used as an optional foundational course. In that case, this will be the fourth course in the program of study.
Necessary Equipment:	None
Aligned Student Organization(s):	HOSA: http://www.tennesseehosa.org Amanda Hodges, (615) 532-6270, Amanda.Hodges@tn.gov
Coordinating Work-Based Learning:	If a teacher has completed work-based learning training, he or she can offer placement in Job Shadowing or Clinical Internship. For more information, please visit http://www.tn.gov/education/cte/wb/ .
Available Student Industry Certifications:	None
Dual Credit or Dual Enrollment Opportunities:	There are no known dual credit/dual enrollment opportunities for this course. If interested in developing, reach out to a local postsecondary institution to establish an articulation agreement.
Teacher Endorsement(s):	577, 722
Required Teacher Certifications/Training:	None
Teacher Resources:	http://www.tn.gov/education/cte/HealthScience.shtml

Course Description

Epidemiology and Global Health is a comprehensive applied course in the Public Health program of study that places students at the intersection of health science and health policy. This course investigates the patterns, causes, and effects of diseases in a variety of populations, and how the provision of healthcare has changed in response to global needs. Successful international strategies and programs will be examined. Upon completion of this course, students will be able to interpret and

communicate statistical information relating to the distribution of disease and mortality/morbidity in the United States and globally, determine national and international health disparities, analyze national and international health policies, and evaluate outcomes from a range of health interventions. Standards in this course are aligned with Tennessee Common Core State Standards for English Language Arts & Literacy in Technical Subjects, Tennessee Common Core State Standards in Mathematics, and Tennessee state standards in Anatomy and Physiology.*

Program of Study Application

This is the third course in the *Public Health* program of study. For more information on the benefits and requirements of implementing this program in full, please visit the Health Science website at <http://www.tn.gov/education/cte/HealthScience.shtml>.

Course Standards

Introduction to Epidemiology and Global Health

- 1) Define epidemiology and global health, discussing in detail why these fields should be studied, the principles and goals of each, and the concept of health citizenship in the context of disease prevention and health management. Determine the differences between field, clinical, and chronic epidemiology. (TN CCSS Reading 4, 9)
- 2) Research the various agencies and organizations, including transnational and non-governmental organizations (NGOs), involved in the study of global health and epidemiology.** Examine their roles as they relate to policymaking, research, program implementation, and/or monitoring and evaluation work. Organize the information into a visual, oral, and/or written presentation, citing examples of these actors' impact on global health initiatives drawn from reports, legislation, press releases, or other public documents. (TN CCSS Reading 1, 5, 7; TN CCSS Writing 4, 6, 8, 9)
- 3) Investigate careers within the fields of epidemiology and global health. Outline the educational requirements for each career as well as state and national guidelines governing practicing professionals (such as licensing, certifications, training, and compliance). Create and maintain a document detailing potential training programs, schools, and examinations suitable for obtaining required credentials for a specific occupation. (TN CCSS Writing 2, 7, 8, 9)
- 4) Research and summarize the range of skills, competencies, and professional traits required for careers in the epidemiology and global health fields. Compare findings to current individual strengths and identify opportunities for personal development. Translate real-time and projected labor market data into narratives to identify local and national employment opportunities and determine areas of growth within epidemiology and global health fields. (TN CCSS Reading 2, 7; TN CCSS Writing 4, 8, 9)
- 5) Gather relevant information from professional journals, news media, and trade magazines (in both print and digital formats) concerning the history of global health and epidemiology. Develop a visual, oral, and/or written presentation describing notable historical figures and pioneers who have made significant contributions in disease recognition, treatment, and prevention. (TN CCSS Reading 1, 7, 9; TN CCSS Writing 4, 6, 8, 9)



- 6) Define the terms endemic, epidemic, and pandemic. Analyze the factors involved in the spread of disease, such as the increase in world travel among socially mobile populations. Research global initiatives currently in place to prevent the spread of diseases/disorders such as influenza, Pertussis, or HIV/AIDS. (TN CCSS Reading 4, 9)

Biostatistics

- 7) Public health surveillance is a mechanism that public health agencies use to monitor the health of communities. Describe the types of data commonly collected by global health organizations and government agencies, including the key parameters (i.e., fertility, life expectancy, infant mortality rates) most often reported in the analysis of public health. Demonstrate the ability to interpret and communicate results from public health surveillance analyses, applying basic statistical concepts such as measurements of central tendency (mean, median, mode), measurements of spread (range, variance, standard deviation), and changes over time. (TN CCSS Reading 1, 2, 4, 8, 9; TN CCSS Writing 2, 4, 9; TN CCSS Mathematics S-ID)
- 8) Relate how biostatistical data is used to identify global health priorities, disparities, and epidemiological transitions, and discuss how advances in public health surveillance have changed the delivery of key healthcare services (such as the need for family planning, vaccinations, or disease treatment). Furnish examples of data-driven policy changes informed by the collection and analysis of health surveillance data. For example, examine a case study of how the World Health Organization responded to the global SARS outbreak of 2004. (TN CCSS Reading 1, 2, 9; TN CCSS Writing 2, 9)
- 9) Compare and contrast the average cost of healthcare in the United States with that of other countries, according to indices compiled by the Organization for Economic Cooperation and Development (OECD). Drawing on a range of public health surveillance data, examine the correlations between average cost and key parameters such as government involvement, availability of insurance, per capita spending, hospital admission rates for chronic diseases, and mortality rates for cervical and colorectal cancer, for example. (TN CCSS Reading 1, 4, 7, 9; TN CCSS Writing 4, 7, 8, 9; TN CCSS Mathematics N-Q, S-ID, S-IC)
- 10) Citing research, news media, and scholarly commentary, discuss the factors that may contribute to the relationship between the cost of care and health of communities. (TN CCSS Reading 1, 2, 7, 9; TN CCSS Writing 4, 7, 8, 9; TN CCSS Mathematics N-Q, S-ID, S-IC)
- 11) Differentiate between descriptive epidemiology and analytical epidemiology research designs, and demonstrate the ability to recognize different methodological approaches as applied to a range of public health studies/reports. Explain the information gathered in each type of study and how that information is important when planning changes in healthcare. (TN CCSS Reading 1, 2, 5, 8; TN CCSS Writing 4, 8, 9)

Disease Causation and Control

- 12) Choose a communicable or non-communicable disease or disorder prevalent in the United States. Using the Centers for Disease Control and Prevention (CDC) Vital and Health Statistics report, describe the occurrence or frequency of the disease across various demographic categories such as sex, age, race/ethnicity, educational attainment, family income, poverty level,



health insurance coverage, marital status, and place of residence. Compare findings with data from a country with a similar prevalence of the disease. For example, examine the prevalence of heart disease in the United States as compared to Ireland. Compile the information into an electronic presentation. Support the interpretation of findings with graphical depictions of the data gathered. (TN CCSS Reading 1, 5, 7; TN CCSS Writing 4, 6, 8, 9)

- 13) An important aspect of the study of epidemiology is to identify factors that place certain populations at a higher risk for developing diseases and disorders. Compare and contrast the two primary models of disease causation: the epidemiologic triad and Rothman's causal pies. Debate the pros and cons of each in a written, oral, or electronic format. (TN CCSS Reading 2, 4, 5; TN CCSS Writing 1, 4)
- 14) Assess the impact that environmental factors, such as natural and unnatural disasters, can have on a range of global health issues. Discuss the implications for disease prevention, containment, and control when environmental conditions are considered. (TN CCSS Reading 2, 9; TN CCSS Writing 8, 9)
- 15) Examine the epidemiology, mortality, morbidity, genetic, and/or biological basis of at least one of the diseases or disorders in each of the areas listed below. Compare the prevalence of the disease/disorder across a variety of populations and countries. Drawing on skills learned in biostatistical analysis, determine the factors that contribute to higher or lower prevalence in a given population or country.
 - a. Infectious Diseases
 - b. HIV/AIDS
 - c. Neurodevelopment disabilities
 - d. Cancer
 - e. Cardiovascular Disease
 - f. Diabetes
 - g. Dementia(TN CCSS Reading 1, 2, 3, 7, 8, 9; TN CCSS Writing 7, 9; TN CCSS Mathematics S-ID, S-IC, S-CP)
- 16) Compare and contrast the health challenges characteristic of urban and rural settings. Analyze factors such as disease management, social and behavioral interventions, nutrition, service disparities, and availability of preventive measures like screenings. Debate the key challenges to the provision of services across a variety of global settings. (TN CCSS Reading 1, 2, 9; TN CCSS Writing 9)
- 17) Investigate the causes of child/infant mortality within the first five years of life worldwide. Identify effective interventions for prevention of infant and childhood disorders, supporting recommendations with evidence-based medical or public health practice standards retrieved from the kinds of sources described in this course. (TN CCSS Reading 1, 2, 9; TN CCSS Writing 4, 7, 8, 9)
- 18) Explain the 10 steps of an outbreak investigation. As part of a group project, analyze a mock scenario in which the CDC has been called to investigate the outbreak of a foodborne, airborne, windborne, or waterborne disease in the United States or abroad. Determine the scope of the outbreak, identify the specific populations affected or endangered by it, and assign roles and responsibilities to contain and/or eradicate the disease. Drawing on resources used in this



course, make recommendations based on hypothetical findings, protocols, and policies.*** (TN CCSS Reading 2, 4, 7, 9; TN CCSS Writing 2, 4, 7, 8, 9; TN CCSS Mathematics S-ID)

Health Policy

- 19) Research and summarize current policies related to global health in the areas of disease prevention, treatment and control, and educational campaigns. For each of these areas, examine the involvement of relevant national and transnational actors identified in standard 2. Construct an informational or explanatory essay that describes major historical events associated with current policies, evaluates the roles of the actors involved, and interprets public opinion and industry commentary on the impact of the policies to date. (TN CCSS Reading 1, 2; TN CCSS Writing 2, 8)
- 20) Synthesize the standards of practice concerning health and human rights in the Universal Declaration of Human Rights and the Constitution of the World Health Organization. Compare and contrast the documents for principles related to health, human rights, and humanitarian aid. Examine case studies where human rights and public health are intertwined, such as the refugee crisis caused by the civil war in Syria dating from 2011. (TN CCSS Reading 2, 5, 9; TN CCSS Writing 9)
- 21) Research advocacy strategies used to support global health initiatives. Identify the major decision-makers and stakeholders involved in the promotion and implementation of health policies, ranging from the provision of maternal care in under-resourced areas to the administration of humanitarian aid in regions of armed conflict. Discuss the political and transnational process around implementing quality health policies for populations in need. (TN CCSS Reading 2, 5, 6, 9; TN CCSS Writing 9)
- 22) Drawing on material learned in this course, conduct a needs assessment for a target population affected by a health issue such as diabetes, cancer, HIV/AIDS, or other disease/disorder. Retrieve relevant health surveillance data related to the prevalence of the disease/disorder and the environmental and genetic factors that contribute to the problem. Synthesize research on existing policies, programs, and initiatives currently or formerly in place to alleviate the problem, and compile the results of the needs assessment into a written report supported by graphical and statistical aids. (TN CCSS Reading 1, 2, 3, 7, 8, 9; TN CCSS Writing 2, 4, 7, 8, 9; TN CCSS Mathematics S-ID, S-IC, S-CP)
- 23) Building off the needs assessment conducted in standard 21, create a plan to address the needs of the target population. Consider a range of potential policy solutions, weighing the costs and benefits of each, including the obstacles to implementation. Then advance a recommendation for one of the solutions, outlining a strategy to engage the appropriate agencies, decision-makers, and other stakeholders. (TN CCSS Reading 7, 9; TN CCSS Writing 1, 4, 7, 8, 9)



Standards Alignment Notes

*References to other standards include:

- TN CCSS Reading: [Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects](#); Reading Standards for Literacy in Science and Technical Subjects 6-12; Grades 11-12 Students (page 62).
 - Note: While not directly aligned to one specific standard, students who are engaging in activities outlined above should be able to also demonstrate fluency in Standard 10 at the conclusion of the course.
- TN CCSS Writing: [Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects](#); Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6-12; Grades 11-12 Students (pages 64-66).
 - Note: While not directly aligned to one specific standard, students who are engaging in activities outlined above should be able to also demonstrate fluency in Standards 3, 5 and 10 at the conclusion of the course.
- TN CCSS Math: [Tennessee Common Core State Standards for Mathematics](#); Math Standards for High School: Statistics and Probability, Modeling (pages 58-83).
 - Note: The standards in this course are not meant to teach mathematical concepts. However, the concepts referenced above may provide teachers with opportunities to collaborate with mathematics educators to design project based activities or collaborate on lesson planning. Students who are engaging in activities listed above should be able to demonstrate statistical reasoning as applied to specific technical concepts. In addition students will have the opportunity to practice the habits of mind as described in the eight Standards for Mathematical Practice.
- Tennessee Science: [Anatomy and Physiology](#):
 - Note: While not directly aligned to one specific standard, students who are engaging in activities outlined above should be able to also demonstrate fluency in TN Anatomy and Physiology 6.

Additional Notes

**Major agencies and organizations include, but are not limited to: the World Health Organization (WHO), the United Nations, the Pan American Health Organization (PAHO) and the International Committee of the Red Cross (ICRC).

***Resources suggested for the mock outbreak project include:

- CDC Outbreak Investigation Overview for Vessel Sanitation Program: <http://www.cdc.gov/nceh/vsp/surv/investigationoverview.htm>
- CDC Current Outbreak List: <http://www.cdc.gov/outbreaks/>
- Epidemiological Investigation of Outbreaks: <http://www.gov.mb.ca/health/publichealth/cdc/protocol/investigation.pdf>

